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ABSTRACT

This pamphlet describes and/or lists available mathematical publications of SMSG. Described are 12 high school texts, three junior high texts, four texts for slow learners, seven texts for elementary school, three texts for culturally disadvantaged students, eight booklets of supplementary materials, two pamphlets on probability for elementary schools, and two programed texts on probability for secondary students. Listed are 17 pamphlets in the "Supplementary and Enrichment Series," 15 pamphlets containing reprints from journal articles, 14 texts translated into Spanish, 18 books for teacher resources, nine reports of various conferences, 22 expository monographs on various mathematical subjects, 14 reports of the National Longitudinal Study of Mathematics Achivement (NLSMA), four volumes of Soviet studies in the psychology of learning and teaching mathematics, a journal of abstracts and annotations of math education research, three miscellaneous publications, ten Newsletters, and eight reports on various SMSG projects. (JG)

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SCHOOL
MATHEMATICS
STUDY GROUP

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Newsletter No. 34

March 1971

SMSG PUBLICATIONS

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NEW PUBLICATIONS

SECONDARY SCHOOL

In SMSG Newsletter No. 24, October 1966, there appeared a preliminary announcement of a new SMSG curriculum project. The major outcome from this project will be a new junior high school mathematics curriculum.

Distinguishing characteristics of this new curriculum are:

(1) the usual grade placement of mathematical topics is ignored; instead, topics from arithmetic, algebra, and geometry are introduced in a logical sequence and in such a way as to provide mutual support.

(2) this curriculum is devoted solely to those mathematical concepts which the SMSG planning and writing groups believe all citizens should know in order to function effectively in our society.

(3) certain topics new to the junior high school program are included; in particular, probability, statistics, and flow charts.

(4) a strong attempt is made to make clear to the students the relevance of mathematics to problems of the real world.

Classroom tryouts of preliminary versions of many of the chapters indicate that, once teachers are familiar with the new curriculum, most college-capable students should be able to complete this curriculum in three years, i.e., by the end of grade 9. It is presumed that less able students will be able to cover the same material, but over a longer stretch of time.

By the end of the summer of 1971 final revisions of all 28 chapters of this new sequence will have been finished, and the entire sequence will be available for general use.

In addition, a one-semester tenth grade course will be made available. This course is designed for those students who have completed the new junior high school sequence and who wish to study further mathematics. This new text will cover certain topics in formal algebra and geometry not included in the junior high school sequence but prerequisite to the mathematics normally studied in grades 11 and 12. Students completing this text will be able to move without difficulty into the SMSG text "Intermediate Mathematics."

A special revision of some of the early chapters in the junior high school sequence has been prepared for students whose achievement in mathematics during elementary school was very low. A description of this special version appeared in SMSG Newsletter No. 33. Ten additional chapters will be revised in summer of 1971 and made available for classroom use for the 1971-72 school year.

ELEMENTARY SCHOOL

One of the most distinctive characteristics of the SMSG elementary school texts is the early introduction of informal geometric ideas and the substantial amount of the K-6 program devoted to geometry. At the request of many elementary school teachers, principals, and curriculum consultants, the geometry chapters from the SMSG elementary school texts are now made available as a set of separate units.

These are not to be thought of as a course in geometry for the elementary school. Rather they are intended to be used as supplements to presently existing elementary school mathematics curricula. Which units will be useful for the purpose, and at what times, will depend on the backgrounds of the students and the objectives of the mathematics program in the particular school.

A teacher's commentary is available for each chapter.

BRIEF DESCRIPTIONS OF SMSG PUBLICATIONS

HIGH SCHOOL TEXTBOOKS

These texts are designed for average and above average students in a college preparatory program.

The first four texts listed below were produced simultaneously and hence no one of them presupposes that students using them had studied anything other than a conventional curriculum previously. Newsletter 25 will be of interest to teachers planning to use any of these texts.

The remaining texts on the list below were prepared after the first five and, in general, do take account of the earlier SMSG texts.

The *Programed Algebra* text has a separate response booklet so the text is reusable. *Geometry With Coordinates* is designed as an alternative to *Geometry,* putting more emphasis on analytic geometry. *Matrix Algebra* and *Analytic Geometry* are intended for students who have completed the prerequisites for calculus but wish to postpone study of this subject until college.

Algorithms, Computation, and Mathematics is a one semester course intended for the last year of high school. It is concerned with mathematical concepts which are fundamental to computer science. The text itself does not require a specific programing language and two supplementary texts are available, one devoted to FORTRAN and the other to ALGOL.

Calculus appears in three parts. The first two together constitute a normal one year course and cover, for example, the CEEB Calculus BC advanced placement syllabus. Part three, which is available separately, takes up supplementary topics, mainly applications of calculus to the physical sciences.

Calculus of Elementary Functions interweaves the content of *Elementary Functions* with an introduction to differential and integral calculus. It is designed to cover the Calculus AB syllabus of the College Board advanced placement examination.

Transition Course is the one-semester 10th grade course designed to bridge the gap between the new junior high school course, *Secondary School Mathematics,* and the 11th and 12th grade SMSG texts.

Each text is accompanied by an extensive teacher's commentary.

First Course in Algebra
Geometry
Intermediate Mathematics
Elementary Functions
Introduction to Matrix Algebra
Programed First Course in Algebra
Geometry with Coordinates
Analytic Geometry
Algorithms, Computation, and Mathematics
Calculus
Calculus of Elementary Functions
Transition Course

JUNIOR HIGH SCHOOL TEXTS

These texts renew and extend the mathematics of the elementary school in such a way as to provide a sound intuitive foundation for high school courses. A considerable amount of informal geometry is included.

These texts were prepared for students who had only a conventional mathematics program in elementary school. Teachers using these texts with students who have had a more modern elementary program will be interested in Newsletter No. 25.

Secondary School Mathematics is a new curriculum for grades 7 through 9 in which the sequence in which topics appear is considerably different from that of the past.

Mathematics for Junior High School, Volume I
Mathematics for Junior High School, Volume II
Secondary School Mathematics

TEXTS FOR SLOWER STUDENTS

These texts include the bulk of the mathematics in the texts for grades 7–9 listed above. However, the level of reading difficulty has been reduced to make them more suitable for students who are slightly below average in ability. It is expected that such students will proceed through these materials at a reduced rate.

Report No. 5 deals with a study of the use of these texts with students in the 25th to 50th percentile in aptitude.

Each text is accompanied by an extensive teacher's commentary.

Secondary School Mathematics, Special Edition, is a specially prepared version of some of the early chapters of *Secondary School Mathematics,* explicitly designed for 7th and 8th grade students whose achievement in mathematics in elementary school was very low.

Introduction to Secondary School Mathematics, Volume I
Introduction to Secondary School Mathematics, Volume II
Introduction to Algebra
Secondary School Mathematics, Special Edition

ELEMENTARY SCHOOL TEXTS

The texts for grades 4–6 presuppose a conventional program through grade 3. Teachers using these texts with students who have had a more modern primary school program will be interested in Newsletter No. 28. The emphasis in all these texts is similar to that of the Junior High School texts.

In the teacher's commentary for each text all pages of the student text are reproduced. For kindergarten there is only a teacher's book.

Mathematics for the Elementary School, Book K (Teacher's Commentary only)
Mathematics for the Elementary School, Book 1
Mathematics for the Elementary School, Book 2
Mathematics for the Elementary School, Book 3
Mathematics for the Elementary School, Grade 4
Mathematics for the Elementary School, Grade 5
Mathematics for the Elementary School, Grade 6

MATHEMATICS FOR CULTURALLY DISADVANTAGED CHILDREN

Special editions of the teacher's commentary for kindergarten and for grade one as well as the student work book for grade one have been prepared for use with culturally disadvantaged children. Studies in Mathematics, Volume 13 (listed below), is designed for use in in-service courses for teachers planning to use these materials.

Reports No. 2 and 4 will be of interest to those contemplating use of these materials.

The last item on the list below is a booklet which describes a number of activities appropriate for pre-school programs and designed to prepare young children for the kind of kindergarten and first grade mathematics program which SMSG has suggested.

Mathematics for the Elementary School, Book K, Special Edition

Mathematics for the Elementary School, Book I, Special Edition
Developing Mathematics Readiness in Pre-School Programs

SUPPLEMENTARY MATERIALS

A variety of booklets is available. Their common characteristic is that each requires less than a full academic year.

The first three of the following booklets use simple experiments from physical science to introduce and motivate mathematical ideas. They are designed for grades seven, eight, and nine. The later booklets do not presuppose study of the earlier ones.

The fourth booklet below parallels *Mathematics Through Science, Part 2,* but uses simple experiments from biological science rather than physical science.

Mathematics Through Science, Part 1
Mathematics Through Science, Part 2
Mathematics Through Science, Part 3
Mathematics and Living Things

The next booklet contains material not included in the textbooks for grades seven and eight and is designed for abler students.

Junior High School Supplementary Unit

The next two booklets are designed for outside reading by students in grades nine through twelve.

Essays on Number Theory I
Essays on Number Theory II

The following booklet, based on the first chapter of "Intermediate Mathematics" provides a review of the structural properties of the real number system and of its subsystems.

Development of the Real Number System

PROBABILITY UNITS

Two pamphlets on probability have been prepared, one for the primary grades and one for the intermediate elementary school grades. A classroom set of spinners is available for use with each of these.

A programed short text on probability for use in junior high school is also available and a second programed text, presupposing the first and probably more suitable for senior high school, is also available.

Probability for Primary Grades
Probability for Intermediate Grades
Introduction to Probability, Part I
Basic Concepts
Introduction to Probability, Part II
Special Topics

SUPPLEMENTARY AND ENRICHMENT SERIES

Most of these pamphlets are designed to allow teachers to try short modern treatments of particular mathematics topics in class. Some, however, are designed for independent study or enrichment. Teacher's commentaries are available for some of these.

Functions
Circular Functions
The Complex Number System
The System of Vectors
Non-Metric Geometry
Plane Coordinate Geometry
Inequalities
Numeration
Algebraic Structures
Factors and Primes
Mathematical Systems
Systems of First Degree Equations in Three Variables
Radioactive Decay
Absolute Value
Mathematical Theory of the Struggle for Life
$1 + 1 = ?$
Order and The Real Numbers: A Guided Tour
The Mathematics of Trees and Other Graphs

REPRINT SERIES

Each of these pamphlets is devoted to a particular topic in mathematics and contains reprints of articles selected from a variety of journals.

The Structure of Algebra
Prime Numbers and Perfect Numbers
What is Contemporary Mathematics?
Mascheroni Constructions
Space, Intuition and Geometry
Nature and History of Pi
Computation of Pi
Mathematics and Music
The Golden Measure
Geometric Constructions
Memorable Personalities in Mathematics: Nineteenth Century
Memorable Personalities in Mathematics: Twentieth Century
Finite Geometry
Infinity
Geometry, Measurement and Experience

SPANISH TRANSLATIONS

Some of the texts listed below have been translated into Spanish for use in Puerto Rico. Translations of the teacher's commentaries are also available in some cases. The teacher's commentaries,

but not the student texts, for grades 4, 5, and 6 have also been translated, as have been three volumes for teachers from the Studies in Mathematics series.

Matematicas Para El Primer Ciclo Secundario, Volumen I
Matematicas Para El Primer Ciclo Secundario, Volumen II
Matematicas Para La Escuela Secundaria, Primer Curso de Algebra
Matematicas Para La Escuela Secundaria, Geometria
Matematicas Para La Escuela Secundaria, Matematica Intermedia
Matematicas Para La Escuela Secundaria, Introducción Al Algebra De Las Matrices
Matematicas Para La Escuela Secundaria, Funciones Elementales
Geometria Analitica
Matematicas Para La Escuela Primaria, Grado 4, Comentario
Matematicas Para La Escuela Primaria, Grado 5, Comentario
Matematicas Para La Escuela Primaria, Grado 6, Comentario
Conceptos De Geometria Intuitiva
El Curso Conciso En Matematicas Para Los Profesores De Escuela Primaria
Introducción A Sistemas Numéricos

STUDIES IN MATHEMATICS

The books in this series are all intended for teachers. Some provide the background for a specific student course, and others are more general in nature.

Euclidean Geometry Based on Ruler and Protractor Axioms
Structure of Elementary Algebra
Geometry
Concepts of Informal Geometry
Number Systems
Intuitive Geometry
Concepts of Algebra
Brief Course in Mathematics for Elementary School Teachers
Applied Mathematics in the High School
Mathematical Methods in Science
Brief Course for Junior High School Teachers
Inservice Course for Primary School Teachers
Introduction to Number Systems
Calculus and Science
Some Uses of Mathematics

Mathematical Concepts of Elementary Measurement
Puzzle Problems and Games Project
Reviews of Recent Research in Mathematics Education

CONFERENCE REPORTS

These are reports of a variety of conferences sponsored by SMSG. Some of these conferences were held to acquaint teachers with the contents and objectives of SMSG texts. Others were devoted to discussions of problems in mathematics education and the role of SMSG in attacking these problems.

Elementary School Mathematics
Orientation Conference for SMSG Experimental Centers
Orientation Conference for SMSG Elementary School Experimental Centers
Orientation Conference for Geometry with Coordinates
Future Responsibilities for School Mathematics
Mathematics Education for Below Average Achievers
A Conference on Mathematics For Gifted Students
A Conference on Mathematics Education in the Inner City Schools
A Conference on Responsibilities for School Mathematics in the 70's

NEW MATHEMATICAL LIBRARY

This consists of a series of short expository monographs on various mathematical subjects. The objectives of this series are the dissemination of good mathematics in the form of elementary topics not usually covered in the school curriculum, the awakening of interest among gifted students, and the presentation of mathematics as a meaningful human activity.

The authors of these monographs are mathematicians interested and well versed in the fields they treat.

A trade edition of these monographs is available through Random House. In addition, a special edition is available only to high school students and teachers at a reduced rate from the L. W. Singer Co. An order form appears on page 30.

Niven — Numbers: Rational and Irrational (NML-1)
Sawyer — What is Calculus About? (NML-2)

Beckenbach and Bellman — An Introduction to Inequalities (NML-3)
Kazarinoff — Geometric Inequalities (NML-4)
Davis — The Lore of Large Numbers (NML-6)
Zippin — Uses of Infinity (NML-7)
Yaglom — Geometric Transformations I (NML-8)
Olds — Continued Fractions (NML-9)
Ore — Graphs and Their Uses (NML-10)
Hungarian Problem Book I (NML-11)
Hungarian Problem Book II (NML-12)
Aaboe — Episodes from the Early History of Mathematics (NML-13)
Grossman and Magnus — Groups and their Graphs (NML-14)
Niven — Mathematics of Choice (NML-15)
Friedrichs — From Pythagoras to Einstein (NML-16)
Contest Problem Book II (NML-17)
Chinn and Steenrod — First Concepts of Topology (NML-18)
Coxeter and Greitzer — Geometry Revisited (NML-19)
Ore — Invitation to Number Theory (NML-20)
Yaglom — Geometric Transformations II (NML-21)
Sinkov — Elementary Cryptanalysis (NML-22)
Honsberger — Ingenuity in Mathematics (NML-23)

NLSMA REPORTS

The first six reports reproduce the test batteries used in a five year longitudinal study of mathematics achievement and provide statistical information on the various scales contained in these batteries. Report 9 contains information about the schools, communities, and teachers involved in the study.

NLSMA Report No. 1 (Parts A and B): X Population Test Batteries
NLSMA Report No. 2 (Parts A and B): Y-Population Test Batteries
NLSMA Report No. 3: Z-Population Test Batteries
NLSMA Report No. 4: Description and Statistical Properties of X-Population Scales
NLSMA Report No. 5: Description and Statistical Properties of Y-Population Scales
NLSMA Report No. 6: Description and Statistical Properties of Z-Population Scales
NLSMA Report No. 7: The Development of Tests
NLSMA Report No. 9: Non-Test Data

NLSMA Report No. 10: Patterns of Mathematics Achievement in Grades 4, 5, and 6: X-Population
NLSMA Report No. 11: Patterns of Mathematics Achievement in Grades 7 and 8: X-Population
NLSMA Report No. 12: Patterns of Mathematics Achievement in Grades 7 and 8: Y-Population
NLSMA Report No. 13: Patterns of Mathematics Achievement in Grade 9: Y-Population
NLSMA Report No. 14: Patterns of Mathematics Achievement in Grade 10: Y-Population

SOVIET STUDIES IN THE PSYCHOLOGY OF LEARNING AND TEACHING MATHEMATICS

Each volume in the series contains one or more articles under a general heading, such as the learning of mathematical concepts, the structure of mathematical abilities, or methods of teaching mathematics. The articles form neither a random nor even a representative sample of the entire Soviet literature. Instead, the editors have chosen, from publications available to the Survey of Recent East European Mathematical Literature at the University of Chicago, articles that illustrate some of the most interesting aspects of recent Soviet pedagogical theory and research.

Volume I: The Learning of Mathematical Concepts
Volume II: The Structure of Mathematical Abilities
Volume III: Problem Solving in Arithmetic and Algebra
Volume IV: Problem Solving in Geometry

INVESTIGATIONS IN MATHEMATICS EDUCATION

This journal will contain abstracts of published research reports dealing with mathematics education. Each abstract includes an objective indication of the (1) purpose, (2) rationale, (3) research design and procedure, (4) findings, and (5) the investigator's interpretation of the findings — insofar as the information has been included in the research report.

In addition, each abstracter is given an opportunity to comment upon or raise questions about the research report for which he prepares an abstract.

The first issue of this journal contains abstracts of 16 research reports published during the first

half of 1968. No fixed schedule has yet been set for later issues, but it is hoped that two issues can be prepared each year.

No subscriptions to this journal can be accepted. However, a mailing list will be maintained at SMSG Headquarters and each person on the list will be notified by postcard whenever a new volume of this journal is published. Requests for inclusion on this mailing list should be addressed to:

SMSG, Cedar Hall
Stanford University
Stanford, Calif. 94305

A Journal of Abstracts and Annotations
Volumes I, II, and III

MISCELLANEOUS PUBLICATIONS

Very Short Course in Mathematics for Parents
This booklet is designed to give parents (and other interested persons) a chance to work through a small sample of "modern" mathematics and thus to see more clearly how and in what ways the "modern" treatment differs from the traditional.

Philosophies and Procedures of SMSG Writing Teams
Brief accounts of the philosophies developed by SMSG writing teams and the procedures used in preparing the SMSG texts.

SMSG: The Making of a Curriculum, By William Wooton
This book records the activities of the School Mathematics Study Group from 1958 to 1962.

FILMED COURSE FOR ELEMENTARY SCHOOL TEACHERS

This course consists of thirty half-hour color films. The series is intended primarily for inservice elementary school teachers and is intended to furnish a foundation in mathematics for any of the newer elementary school mathematics programs. The series is mathematical in content but no mathematical prerequisites are presumed. Studies in Mathematics, Vol. 9, is designed to accompany this filmed course.

The first sixteen of these films provide a suitable background in mathematics for teachers of grades K–3. The remainder, building on these, are concerned with mathematics normally taught in grades 4–6.

The distributor for these films is Modern Learning Aids, 1212 Avenue of the Americas, New York, New York 10036. Distribution will be from the following five locations: 160 E. Grand Avenue, Chicago, Illinois 60611; 1411 Slocum Street, Dallas, Texas 75207; 714 Spring Street, N.W., Atlanta, Georgia 30308; 1145 North MacCadden Place, Los Angeles, California 90038; and 315 Springfield Avenue, Summit, New Jersey 07901.

NEWSLETTERS

In order to keep the mathematical community informed, an SMSG Newsletter is published from time to time. A postcard request is sufficient for one to be placed on the mailing list.

The following issues are still available in limited quantities from: SMSG – Cedar Hall, Stanford University, Stanford, California 94305.

Newsletter No. 15 – Reports
Newsletter No. 17 – Panel on Supplementary Publications
Newsletter No. 19 – Report of a Survey of Inservice Programs for Mathematics Teachers
Newsletter No. 21 – The New Mathematical Library
Newsletter No. 23 – Panel on Supplementary Publications
Newsletter No. 24 – General Information
Newsletter No. 25 – Articulation of Content of SMSG Texts Grades 7–10
Newsletter No. 28 – Articulation of Content of SMSG Texts Grades 1–3 and Grade 4
Newsletter No. 30 – Status Reports and Recent Publications
Newsletter No. 33 – Mathematics for Disadvantaged and Low Achieving Students

REPORTS

This series consists of reports, too long to be included in SMSG Newsletters, on various SMSG projects. Single copies may be obtained by a postcard request to SMSG, Cedar Hall, Stanford University, Stanford, California 94305.

1. *The SMSG Programed Learning Project*
2. *The Special Curriculum Project*
3. *A Film-Film Text Study*
4. *The Special Curriculum Project: 1965–66*
5. *The Slow Learner Project: The Secondary School "Slow Learner" in Mathematics*
6. *Preliminary Report on an Experiment with Junior High School Very Low Achievers in Mathematics*

7. *Final Report on an Experiment with Junior High School Very Low Achievers in Mathematics*
8. *The Mathematics Through Science Study: Attitude Changes in a Mathematics Laboratory*

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1. Accredited schools will be given an educational discount of 30%. Shipping charges will be billed to the purchaser.

2. Other institutions or individuals interested in mathematics education will be given an educational discount of 30% on orders totaling $10 or more. Shipping charges will be billed to the purchaser.

3. Orders totaling less than $10, and not from accredited schools, will be billed at list price, but shipping charges by book post will be paid by A. C. Vroman.

4. Orders from individuals should be accompanied by remittance, including 5% sales tax on orders originating in California.

5. Orders from overseas accounts which have not established credit should be accompanied by remittance.

6. We regret that we are unable to supply free desk and examination copies.

7. Returns may **not** be made without prior permission.

8. We believe that it is vital to the success of the individual student as well as to the planned curriculum of the entire class, that Teacher's Commentaries not be sent by us to students. We therefore request that teachers ordering Commentaries for examination please do so on school stationery or in some other way to indicate professional status.

9. As it takes longer to process an order during the rush period in July, August, and September, we urgently suggest that you place your order well in advance of your needs. Orders will be shipped on a first come, first served basis.

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